

REMARKS

This Amendment is responsive to the Office Action mailed October 3, 2007, which sets a three-month shortened statutory period for response, to end January 3, 2008. With this Amendment, Applicants amend claims 1 and 6, and cancel claims 2, 4, 7-11, and 13-17. Claims 1, 3, 5, 6, 12, and 18 are pending. Claims 1, 3, 5, and 12 are under consideration. Claims 6 and 18 remain pending subject to possible rejoinder at the Examiner's discretion.

Reconsideration and withdrawal of the rejections made in the above-referenced Office Action are respectfully requested in view of the following amendments and remarks. Support for the amendments as filed can be found in the specification and claims as filed, e.g., original claims 2 and 7.

Election/Restriction

Applicants thank the Examiner for reconsideration of the requirement for election/restriction. Applicants maintain that the present application is a National Stage application submitted under 35 U.S.C. § 371, and thus, Unity of Invention practice governs the issuance of any Restriction Requirement. Applicants note that the restriction requirement is made final, but are allowing claims 6 and 18 to remain pending subject to possible rejoinder, as stated above.

Information Disclosure Statement

Applicants thank the Examiner for acknowledgement of receipt of the Information Disclosure Statement filed June 14, 2006, and for consideration of all the documents listed therein.

Claim Rejections – 35 U.S.C. § 103(a)

The Office Action rejects claims 1-5 and 17 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kuwahara et al. (U.S. Patent App. Pub. No. 2001/0029072, hereinafter “KUWAHARA”) in view of Srikrishnan (U.S. Patent No. 5,882,987, hereinafter “SRIKRISHNAN”).

In response, Applicants respectfully submit that the claimed subject matter could not have been obvious over KUWAHARA either alone or in combination with SRIKRISHNAN. In particular, Applicants note that claim 1 recites (1) heat treatment of an active layer wafer after formation of an insulating layer thereon or of a bonded wafer after cleavage, in a reducing gas atmosphere comprising hydrogen gas, at a temperature of 1000°C or higher, for one hour or longer; and (2) a silicon epitaxial layer containing highly-concentrated boron (5×10^{18} atoms/cm³ or greater).

With regard to (1) above, KUWAHARA discloses that in step (e), heat treatment is performed for delamination (see, e.g., KUWAHARA at paragraph [0058]). The heat treatment is performed, for example, at a temperature of about 500°C or higher in an inert gas (ibid). Later, KUWAHARA discloses that *the delaminated wafer* can be subjected to heat treatment in a reducing atmosphere containing hydrogen (see, e.g., KUWAHARA at paragraph [0075]-[0079]). In contrast, the instant claims recite to a method wherein hydrogen heat treatment is performed

after the insulating layer is formed on the active layer wafer or on the bonded wafer after cleavage (see paragraph bridging pages 19-20; page 22, 3rd full paragraph; as well as Figures 1 and 2).

With regard to (2) above, the instant specification discloses that if an oxide film is formed for insulating film on top of the epitaxial layer, the high concentration of p-type impurities, such as boron, in the epitaxial layer can increase the rate of formation of the oxide film (see specification at page 5, 2nd paragraph). The instant specification also discloses that if the p-type impurities are contained in the active layer wafer at a high concentration, the generation of a charge vacancy and kink site may be stimulated, thereby accelerating the recrystallization of the crystal defect developed by ion implantation of a light element (see specification, e.g., at page 12, 1st full paragraph). KUWAHARA does not disclose boron doping of the epitaxial layer.

Furthermore, in setting forth the rejection of claim 2 (now incorporated into claim 1), the Office Action asserts that the presently claimed concentration of boron in the epitaxial layer would have been a matter of obvious optimization. However, Applicants respectfully point out that “[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation.” *In re Antonie*, 559 F.2d 618, 195 U.S.P.Q. 6 (CCPA 1977), *In re Boesch and Slaney* 205 U.S.P.Q. 6 215, 219 (CCPA 1980). Contrary to the aforementioned standard (i.e., as set forth *In re Antonie*), Applicants submit that the Examiner does not assert and has not provided any factual evidence which reasonably shows that a boron concentration utilized in the method of SRIKRISHNAN achieves a recognized result.

Applicant submits that KUWAHARA, alone or in any properly reasoned combination, does not disclose or suggest at least the claimed combination of elements. Accordingly, the rejection should be withdrawn.


Conclusion

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejection of record, and allow all the pending claims.

No fee is believed due at this time. If, however, any fee is necessary to ensure consideration of the submitted materials, the Patent and Trademark Office is hereby authorized to charge the same to Deposit Account No. 19-0089.

Should there be any questions, the Examiner is invited to contact the undersigned at the below listed telephone number.

Respectfully submitted,
Akihiko ENDO et al


William S. Boshnick
Reg. No. 44,550

January 3, 2008
GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191
(703) 716-1191

Stephen M. Roylance
Reg. No. 31,296